



(10) **Patent No.:** US 9,408,694 B2
(45) **Date of Patent:** Aug. 9, 2016

- USPC 623/2.11, 1.11, 1.12; 606/192–195;
604/96.01, 264
See application file for complete search history.

- (56)
- References Cited**

- U.S. PATENT DOCUMENTS

- | | | | | |
|-----------|-----|--------|---------|-----------|
| 5,102,417 | A * | 4/1992 | Palmaz | 606/195 |
| 5,603,698 | A * | 2/1997 | Roberts | A61F 2/95 |
| | | | | 604/104 |

- (Continued)

- ## OTHER PUBLICATIONS

- Australian Examination Report for Application No. 2011292463
dated Jul. 9, 2013.

- (Continued)

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- (57) **ABSTRACT**

- A delivery system for delivering and deploying a medical implant, such as a prosthetic heart valve, includes an elongated support member, a sheath, and a tip. The sheath is movable relative to the elongated support member between a distal position overlying the medical implant and a proximal position exposing the medical implant for release from the delivery system. The tip is attached to the elongated support member and is positioned at a distal end of the sheath when the sheath is in the distal position. The tip has a compressed condition and an expanded condition, and a maximum diameter in the expanded condition that is larger than the outer diameter of the sheath.

13 Claims, 7 Drawing Sheets

